February 2021

Observing User Engagement

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ABSTRACT

Content creators can be paid for user engagement by third party observers based on user engagement with their content. However, observers cannot determine user engagement when user agents do not permit access to content consumption history. This disclosure describes web-primitives that enable user agents such as browser applications to enable measurement of user engagement in a privacy-preserving manner. The described primitives are generic enough to enable third party observers to implement tokens based on user engagement, while disabling third-party access to the user's content consumption history.

KEYWORDS

- User engagement
- Content creator
- Influencer
- Web monetization
- Attention tokens
- User agent

BACKGROUND

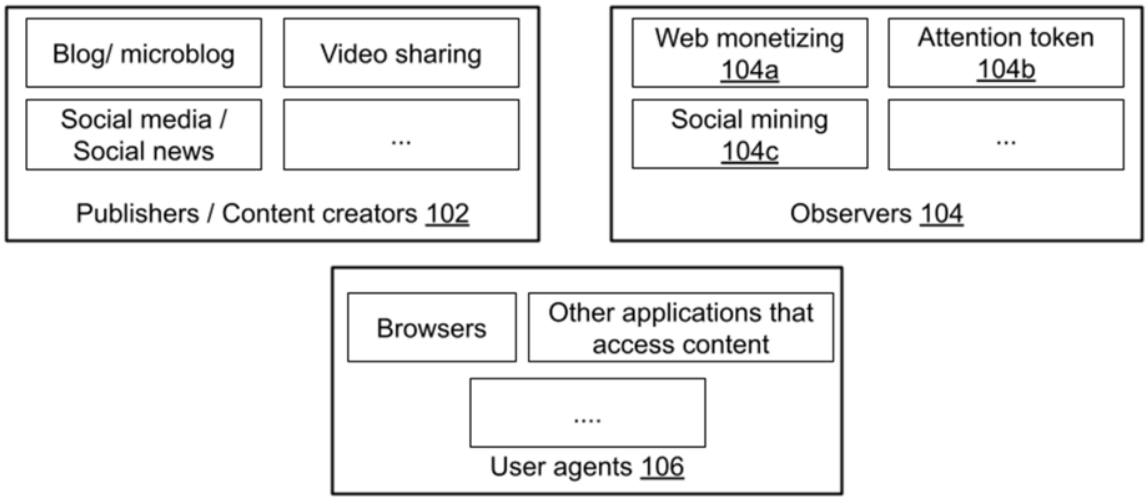

Fig. 1: The ecosystem of publishers, observers, and users

Fig. 1 is a simplified view of an ecosystem of web publishers, also referred to as content creators or influencers (102), observers (104), and user agents (106). Content creators or publishers may generate and publish content on websites, blog/microblog platforms, video sharing platforms, social media/news platforms, etc.

There are various mechanisms by which content creators can be paid for their work and users that consume the content rewarded for their engagement. Web monetization services (104a) use membership fees to pay content creators across partnering publishers. Attention tokens (104b) are used to pay publishers for their content and users for their attention, from revenue earned from advertisers (or other users). Under social mining (104c), users are paid in cryptocurrency for engaging with advertisements or other content, which can then be exchanged for real world (fiat) currency. As illustrated in Fig. 1, services that pay publishers for their content or users for their attention are collectively referred to as observers.

Users typically access content using a content viewing application, referred to as user agents (106), such as browsers or other applications that provide features to access content. Content creators can be paid for user engagement by third party observers based on user engagement with their content. However, observers cannot determine user engagement when user agents do not permit access to content consumption history

DESCRIPTION

This disclosure describes web-primitives that enable user agents to measure user engagement in a privacy-preserving manner. The described primitives are generic enough to enable third-party observers to implement tokens based on user engagement while disabling third-party access to a user's browsing history.

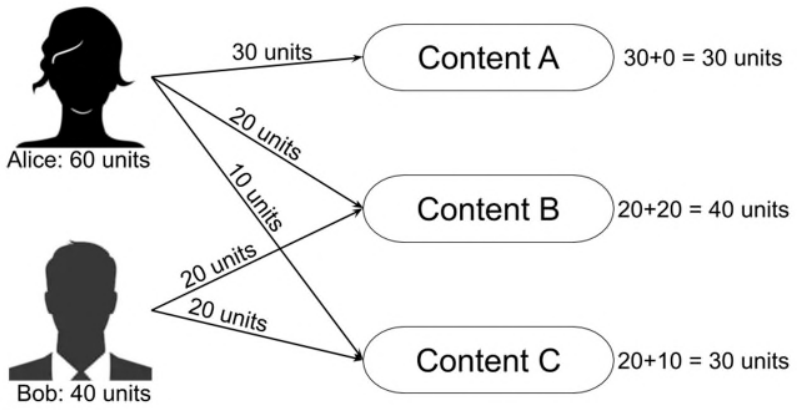

Fig. 2: Observing user engagement in a privacy-preserving manner

Fig. 2 illustrates an example of observing user engagement in a privacy-preserving manner, per the techniques of this disclosure. An observer service, e.g., an attention-token, a social-mining, or a web-monetizing service, allocates tokens to users (or user agents) Alice, Bob, etc. to spend on various pieces of web-content. In this two-user example, Alice receives sixty units of a currency (e.g., tokens, dollars, cryptocurrency, etc.), while Bob receives forty units of the currency. Alice's user agent measures her spending thirty units for content A, twenty units for content B, and ten units for content C. While two users are shown in Fig. 2 for ease of illustration, real-world use cases may typically include a large number of users, e.g., hundreds, thousands, or larger numbers of users.

Spending units of currency for a certain piece of content can entail spending time viewing the content or engaging with the content in some manner, e.g., by liking, short-commenting, long-commenting, etc. Similarly, Bob's user agent measures him spending twenty units for each of contents B and C, while zero units are measured for content A.

Each content provider reports to the observer a corresponding spend number, e.g., a total user spend of 30+0 = 30 units for A; 20+20 = 40 units for B; and 20+10 = 30 units for C. The

individual user components of units spent at a given piece of content are not reported to the observer, thereby preserving user privacy.

Fig. 3 illustrates the measurement of user engagement in a privacy-preserving manner, per the techniques of this disclosure. User consent is obtained to register one or more observers at their respective user agents (308a-b). An observer (302), e.g., an attention-token, a social-mining, or a web-monetizing service, sends a budget (310a-b) to each of a number of user agents (304a-b). A budget for a given user can be determined based on, for example, available advertising money, membership fees or contributions paid by users, currency social-mined by the user, etc. The user agents measure engagement (312a-b) for various pieces of content (306a-b). Each user agent distributes the user's budget amongst the pieces of viewed content based on the user engagement with the pieces of content. User engagement with content may entail viewing the content, liking the content, short-commenting on the content, long-commenting on the content, etc., for each of which differing amounts of money (or tokens) can be applied.

The user agents report back to the observer the budget-usage at each piece of content (314a-b) *without* including any user-identifying information. The observer totals the budget spent at each piece of content by each observer and thereby computes total (but not individual) user engagement on a per-content basis in a privacy-preserving manner (316). While the observer can determine the total spend on individual pieces of content, the observer cannot determine the budget spent by any one user at any individual piece of content.

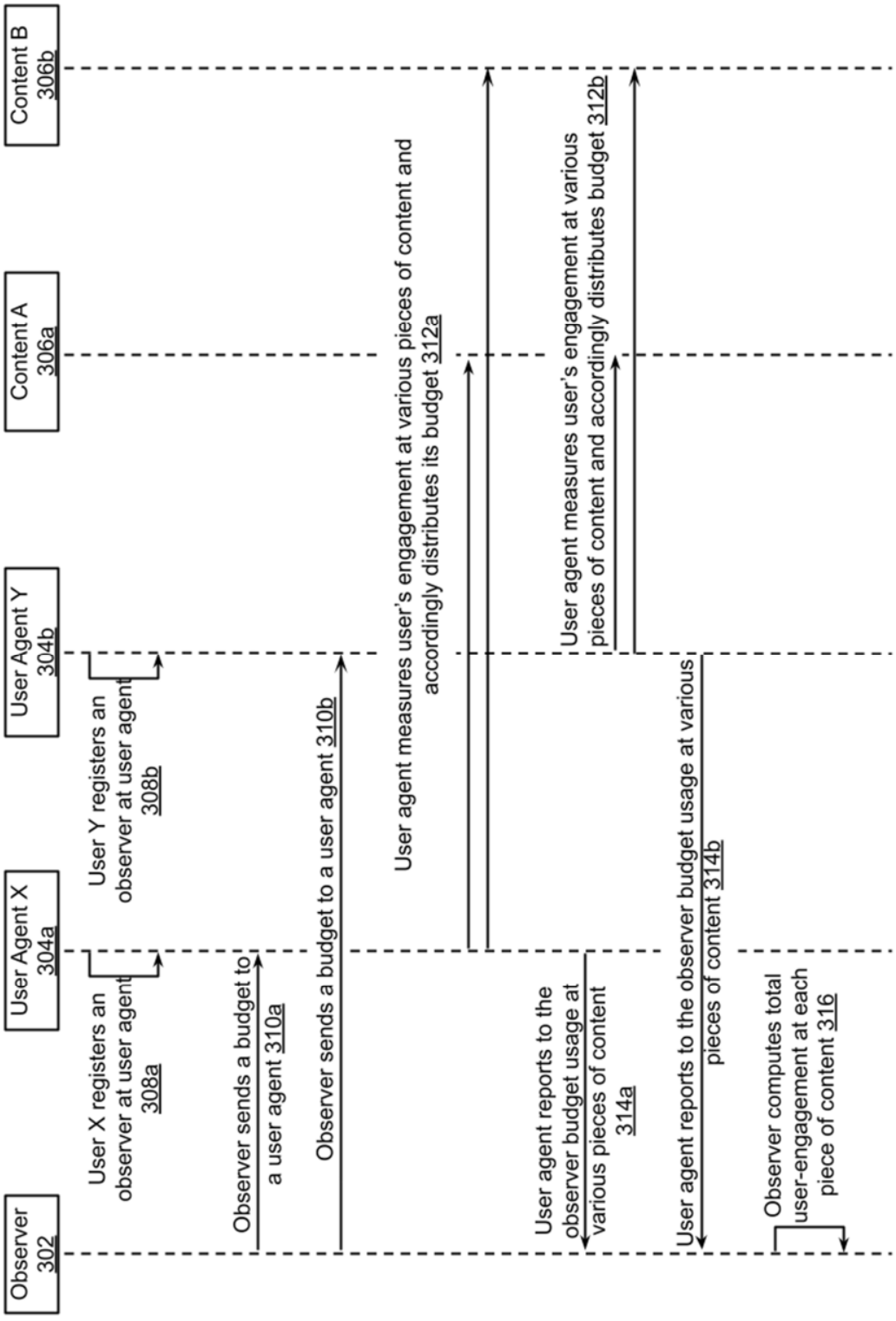

Fig. 3: Measuring user engagement in a privacy-preserving manner

Further to the descriptions above, a user is provided with controls allowing the user to make an election as to both if and when systems, programs, or features described herein may enable the collection of user information (e.g., information from a user agent such as a browser or other application utilized for content interaction, a user's viewing history, a user's spends on content, or a user's preferences), and if the user is sent content or communications from a server. In addition, certain data are treated in one or more ways before it is stored or used, so that personally identifiable information is removed. For example, a user's identity is treated so that no personally identifiable information can be determined for the user. Thus, the user has control over what information is collected about the user, how that information is used, and what information is provided to the user.

CONCLUSION

This disclosure describes web-primitives that enable user agents such as browser applications to enable measurement of user engagement in a privacy-preserving manner. The described primitives are generic enough to enable third party observers to implement tokens based on user engagement, while disabling third-party access to the user's content consumption history.

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